Chapter 2: Alternatives

This chapter describes the alternatives that were considered for meeting the purpose of the VC project. It reviews the alternatives that were eliminated from detailed study through the screening process and describes the No-Action Alternative and the alternative that was carried forward for detailed study (the Action Alternative).

2.1 Alternative Development Process

The alternative development process started with developing a range of initial alternatives to be evaluated within a specified project evaluation area. The project evaluation area is the same as the purpose and need evaluation area (see Figure 1-1, Vineyard Connector Project Evaluation Area, in Chapter 1, Purpose of and Need for the Vineyard Connector Project). The initial alternatives were evaluated using a two-step screening process that was intended to identify the alternatives that would be carried forward for further study. The two steps used in the screening process are described below. A No-Action Alternative was also carried forward for detailed study in order to provide a comparison to the Action Alternative that emerged from the screening process.

2.1.1 Level 1 Screening Process

The initial action alternatives were evaluated to determine how well they met the project's purpose, which is:

- To improve regional north-south mobility west of I-15 and east of Utah Lake between Lehi, American Fork, Lindon, Orem, and Vineyard
- To provide access to the part of Vineyard that includes the former Geneva Steel plant site, which is being redeveloped and will support a UTA transit station

The alternatives that did not meet this primary purpose were eliminated from further study. The remaining alternatives were further evaluated with Level 2 screening.

2.1.2 Level 2 Screening Process

The action alternatives that passed Level 1 screening were next evaluated based on how well they addressed the project objectives, which are:

- Minimize impacts to existing homes and businesses.
- Minimize impacts to important resources such as wetlands, Agriculture Protection Areas (APAs), historic structures, and habitat for sensitive species.
- Consider the land-use and transportation planning objectives of Lehi, American Fork, Lindon, Orem, and Vineyard.

Level 2 screening also considered the width of potential cross-sections (that is, the number of lanes) for each alternative. This was an important consideration in terms of the area of potential effect for each alternative and the ability of each alternative to accommodate the traffic volumes that are anticipated in 2030.

The two-step screening process ensured that the alternatives that were carried forward for detailed evaluation would best meet the project purpose and objectives and would have fewer environmental impacts. The alternatives that would involve changes to the transportation system are called the *action alternatives* to distinguish them from the No-Action Alternative, under which no changes would be made.

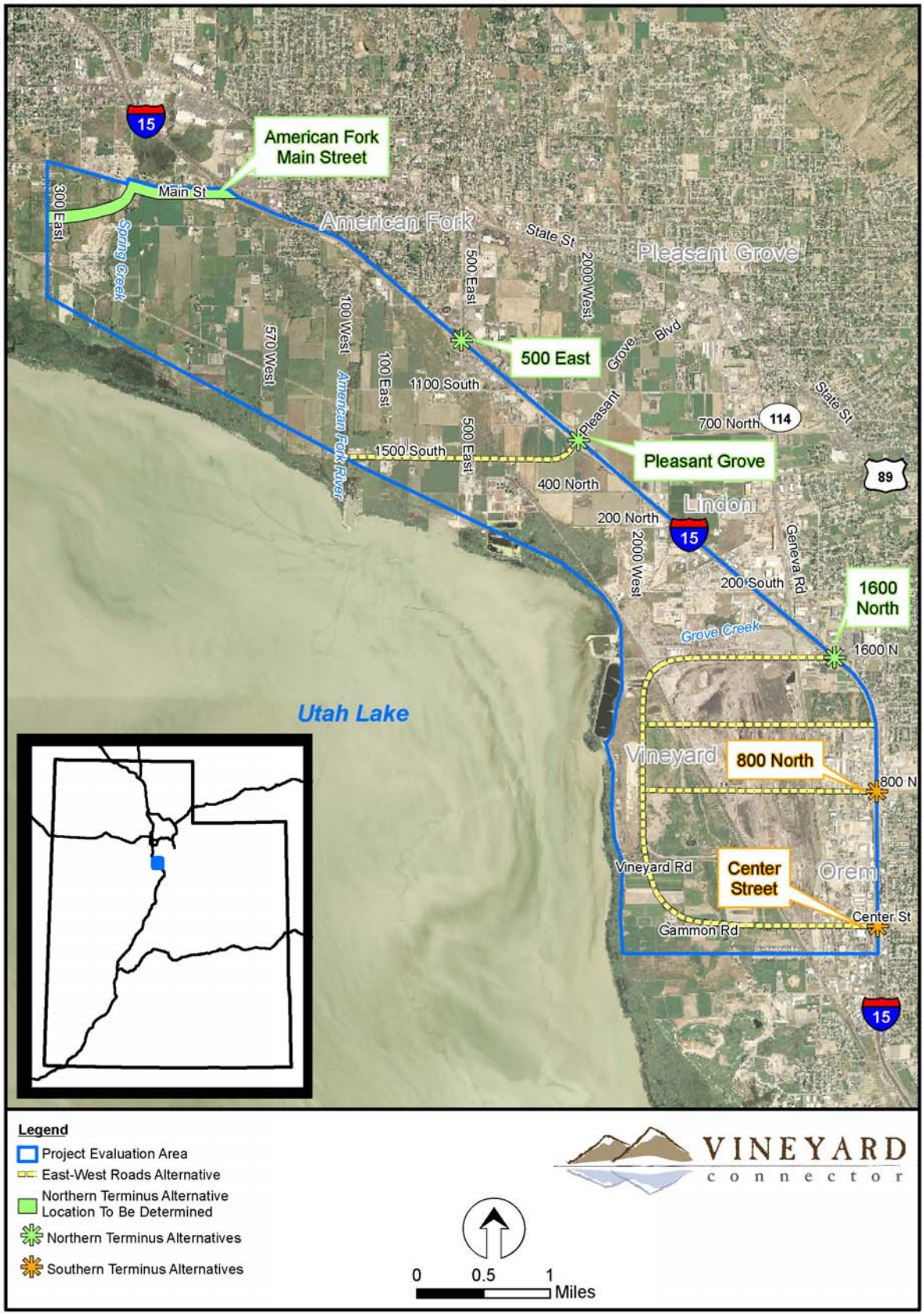
2.2 Development of Initial Alternatives

The initial alternatives identified during project scoping were developed based on agency and public input, existing land-use plans, and regional transportation plans. Agency and public input was collected during meetings and by letter and e-mail. Because the VC could have various end points on both the north and south ends, the initial alternatives were developed based on where they would terminate on the north and south ends. Table 2.2-1 and Figure 2-1 below summarize the initial alternatives.

Table 2.2-1. Initial Alternatives for the Vineyard Connector Project

Alternative		Description
No-Action Alternative		
	No-Action	Under this alternative, a new road would not be built between Lehi/American Fork and Orem. This alternative assumes that other projects included in the MAG Regional Transportation Plan would be constructed in and near the VC evaluation area.
Action Alternatives		
	East-West Roads	This alternative focuses developing a roadway network that would focus on east-west roads at Center Street, 800 North, and 1200 North west of Geneva Road to provide access into the Geneva Steel redevelopment area and proposed commuter-rail station; improvements to 1600 North (the Lindon 1600 North interchange and extension of 1600 North to the west); and improvements to 1500 South (including the Pleasant Grove interchange). This alternative would also include a north-south road through the Geneva Steel redevelopment area.
Northern Terminus Options	American Fork Main Street Interchange	This alternative would consist of a north-south road that would have a northern terminus at Pioneer Crossing (also known as East-West Connector and Lehi 1000 South) between 300 East and the American Fork Main Street/I-15 interchange in American Fork.
	500 East Interchange	This alternative would consist of a north-south road that would have a northern terminus at the 500 East/I-15 interchange in American Fork.
	Pleasant Grove Interchange	This alternative would consist of a north-south road that would have a northern terminus at the Pleasant Grove/I-15 interchange in Pleasant Grove.
	1600 North Interchange	This alternative would consist of a north-south road that would have a northern terminus at the 1600 North/I-15 interchange in Orem.
Southern Terminus Options	800 North Interchange	This alternative consists of a north-south road that would terminate at the 800 North interchange in Orem.
	Center Street Interchange	This alternative consists of a north-south road that would terminate at the Center Street interchange in Orem.

Figure 2-1. Initial Project Alternatives for the Vineyard Connector Project



2.2.1 Level 1 Screening

Level 1 screening was performed on the initial action alternatives listed in Table 2.2-1 above, Initial Alternatives for the Vineyard Connector Project. The VC project's purpose was used as the primary measure in evaluating whether an alternative improved regional and local mobility. The following criteria, which build on the project purpose, were used in Level 1 screening:

- **Improve Mobility:** Does the alternative improve regional north-south mobility west of I-15 and east of Utah Lake between Lehi, American Fork, Lindon, Orem, and Vineyard?
- **Provide Access to the Former Geneva Steel Plant Site and the Vineyard Commuter-Rail Station:** Does the alternative provide access to the part of Vineyard that includes the former Geneva Steel plant site, which is being redeveloped and will support a UTA transit station?

2.2.1.1 Transit and Transportation Management Considerations

Level 1 screening initially included consideration of options focused on transit and transportation management. Neither of these options was carried forward for detailed consideration.

Transit. For the VC project, screening primarily focused on proposed roadway alignments. Since the project area will have a north-south-oriented commuter-rail line with transit stations operational by 2011, no transit alternatives were considered. The travel demand modeling used for the project assumes that the commuter-rail line would be in place and functioning in 2030.

Transportation Management Strategies. Since there are no arterial or larger roads that extend the length of the evaluation area, transportation management strategies such as Transportation Demand Management (TDM) and Transportation Systems Management (TSM) could not be applied with any effectiveness except with regard to the existing park-and-ride lots and future transit stations. Because of the lack of facilities that TSM and TDM could be applied to, overall transportation management strategies alone could not meet the project purpose and were not considered in this alternatives analysis.

2.2.1.2 Level 1 Screening Methodology

Improve Mobility

Mobility refers to the ease with which people can move from place to place using a transportation system. Impediments to mobility can include traffic congestion, numerous accesses to properties (driveways), high accident rates, and other

factors. In this part of Utah County, travelers will typically use a combination of arterial, collector, and local roads for their trips. Each type of road has a specific purpose or function. Arterials provide a high level of mobility for through traffic and limited access to adjacent properties, while local roads provide a high level of access to properties but a low level of mobility. Local roads are typically used for access to residential neighborhoods and have low speed limits. Collector roads provide a balance between mobility and property access. For a transportation system to operate efficiently, all three types of roads are needed.

The VC evaluation area lacks a regional north-south transportation arterial that would provide a valuable linkage between the cities of Lehi, American Fork, Lindon, Orem, and Vineyard. Without at least one arterial to provide the foundation for the local roadway network, the function and safety of the local and rural roads will continue to degrade. Therefore, an alternative's effect on mobility was evaluated based on the following factors:

- The alternative must provide north-south access that links the cities of Lehi, American Fork, Lindon, Orem, and Vineyard.
- The alternative must be compatible with the existing roadway network so that it would not reduce mobility on other roads.

Provide Access to the Former Geneva Steel Plant Site and Commuter-Rail Station

Although currently there is no transit service in the VC evaluation area, UTA is planning to construct a commuter-rail line parallel to the existing heavy rail tracks. UTA's FrontRunner commuter-rail line will include two rail stations in the VC evaluation area: one in Vineyard (in the Geneva Steel redevelopment area) and one near the interchange of Main Street in American Fork and I-15. Both of these stations would eventually serve transit customers in the evaluation area as well as areas to the east and west. Currently, the Vineyard FrontRunner Station location does not have any direct access (that is, no roads currently serve the area).

Also, as discussed in Section 1.3.1, History, the 1,750-acre former Geneva Steel plant site in Vineyard is undergoing extensive remediation and redevelopment. Access to and through this area would contribute to redevelopment of this area consistent with the RCRA permit that applies to the site and the Town of Vineyard's land-use plans. Therefore, alternatives were evaluated for their ability to provide access to the proposed Vineyard rail station and to the larger Geneva Steel redevelopment area in general.

2.2.1.3 Level 1 Screening Evaluation

Improve Mobility

East-West Roads

This alternative would focus on extending east-west roads at Center Street, 800 North, and 1200 North west of Geneva Road to provide access into the Geneva Steel redevelopment area and proposed commuter-rail station; improvements to 1600 North (the Lindon 1600 North interchange and extension of 1600 North to the west); and improvements to 1500 South (including the Pleasant Grove interchange). The alternative would also include a north-south interior road through the Geneva Steel redevelopment area.

Although the addition (extension) of three new roads and improvements to two other roads would improve east-west mobility, the main need is for north-south mobility and connectivity. To address this element of regional mobility, the evaluation area needs a north-south arterial that provides continuous linkage between the cities of Lehi, American Fork, Lindon, Orem, and Vineyard. Furthermore, this north-south arterial would provide a facility that would support the existing and planned east-west transportation network, which would improve the function of local roads that provide access to residential, farm, and commercial properties.

MAG has primary responsibility for regional transportation planning in the project evaluation area. The metropolitan planning process evaluates how roadway, transit, and pedestrian projects in a region interrelate, including the connectivity from one project to the next and how each project affects the others. The 2007 Regional Transportation Plan shows the Vineyard Connector project (referred to as the East Lake Parkway project) as a north-south arterial road connecting Orem and Lehi. Therefore, improvements to east-west roads would not be consistent with regional transportation planning and the interrelation of the transportation network.

Because this alternative would not meet the screening criteria of providing north-south connectivity between the cities of Lehi, American Fork, Lindon, Orem, and Vineyard and would not be consistent with regional transportation planning, it was eliminated from detailed study.

Northern Terminus Options

This section describes how each northern terminus option would address the criterion of improving north-south mobility in the evaluation area.

American Fork Main Street Interchange. Under this option, the northern terminus of the VC would be just west of the American Fork Main Street interchange and would connect to Pioneer Crossing. This interchange is planned for improvement as part of the I-15 project, and American Fork Main Street is identified as an important arterial in the American Fork General Plan Transportation Element (Horrocks Engineers 2004). American Fork Main Street provides access to one of the main commercial districts in American Fork. By ending the VC at Pioneer Crossing, the road would provide regional mobility and connectivity between the cities of Lehi, American Fork, Lindon, Orem, and Vineyard. Therefore, with a northern terminus of American Fork Main Street, this option would meet the criterion of providing continuous north-south access to the area between Lehi and Orem.

500 East Interchange. Under this option, the northern terminus of the VC would be the 500 East/I-15 interchange in American Fork. Because the American Fork Transportation Element identifies 500 East as an arterial street and because it provides commercial access north of I-15, a connection to this interchange would be compatible with the existing transportation network. However, this alternative would not meet the criterion of providing a connection from Lehi (by way of Pioneer Crossing) and the northern part of the evaluation area to the cities of Lindon, Orem, and Vineyard. Therefore, this option was eliminated from detailed study.

Pleasant Grove Interchange. Under this option, the northern terminus of the VC would be the Pleasant Grove/I-15 interchange in Lindon. This recently constructed interchange provides access to areas planned for new development adjacent to I-15 and to existing commercial and residential areas east of I-15 in Lindon and Pleasant Grove. A VC connection at this interchange would fit within the overall transportation system network, but this alternative would not meet the criterion of providing access between the cities of Lehi (by way of Pioneer Crossing) and American Fork and the cities of Lindon, Orem, and Vineyard because it would not provide a direct connection to American Fork and Lehi. In addition, a connection at this interchange would leave the northern part of the evaluation area without an arterial road to provide a connection to other roads as described in the Regional Transportation Plan. Therefore, this option was eliminated from detailed study.

1600 North Interchange. Under this option, the northern terminus of the VC would be the 1600 North interchange in Orem. This interchange would be improved under the proposed I-15 improvement project. Because the area around

1600 North is a growing commercial center, a VC connection at this interchange would fit within the overall transportation system network. However, this alternative would not meet the criterion of providing access between the cities of Lehi (by way of Pioneer Crossing), American Fork, and Lindon and the cities of Orem and Vineyard because it would not provide a direct connection to Lindon, American Fork, and Lehi. In addition, a connection at this interchange would leave the northern part of the evaluation area without an arterial road to provide a connection to other roads as described in the RTP. Therefore, this option was eliminated from detailed study.

Southern Terminus Options

800 North Interchange. Under this option, the southern terminus of the VC would be at 800 North in Orem. The Orem Street Classification Map (City of Orem 2007) shows 800 North as a principal arterial, and 800 North east of I-15 has recently undergone extensive transportation improvements. The land along 800 North is one of the city's main commercial districts, and the road provides access to Provo Canyon and Heber Valley (via SR 52 and U.S. Highway 189 [U.S. 189]). In addition, extensive improvements are planned for the interchange at 800 North as part of the I-15 improvement project. Connecting the VC to 800 North fits within the overall existing roadway network and the City's desire to maintain 800 North as a primary access to commercial areas in the western part of the city. By ending the VC at 800 North, the road could provide continuous access between Orem and the cities of Lehi (by way of Pioneer Crossing), American Fork, Lindon, and Vineyard. Therefore, this option was carried forward into Level 2 screening.

Center Street Interchange. Under this option, the southern terminus of the VC would be at Center Street in Orem. The Orem Street Classification Map (City of Orem 2007) shows Center Street as a principal arterial between Geneva Road and I-15 and a minor arterial east of I-15. The I-15 improvement project also includes reconstruction of the Center Street interchange. This alternative would meet the screening criterion of providing access between Orem and the cities of Lehi (by way of Pioneer Crossing), American Fork, Lindon, and Vineyard. Therefore, this option was carried forward into Level 2 screening.

Provide Access to the Former Geneva Steel Plant Site and Commuter-Rail Station

All of the initial action alternatives would provide access to the proposed commuter-rail station and the former Geneva Steel plant site. Therefore, none of the alternatives were eliminated based on this criterion.

2.2.1.4 Level 1 Screening Results

Level 1 screening focused on two criteria: improving mobility and providing access. As shown in Table 2.2-2, the Northern Terminus American Fork Main Street Option, Southern Terminus 800 North Option, and Southern Terminus Center Street Option met all of the screening criteria, so they were the action alternatives carried forward into Level 2 screening.

Table 2.2-2. Level 1 Screening Results

	Alternatives[a]							
			Northern Terminus Options				Southern Terminus Options	
Level 1 Screening Criterion	No-Action	East-West	American Fork	500 East	Pleasant Grove	1600 North	800 North	Center Street
Improves regional mobility	No	No	Yes	No	No	No	Yes	Yes
Provides access	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[a] East-West = East-West Roads option; American Fork = American Fork Main Street option; 500 East = 500 East Interchange option; Pleasant Grove =Pleasant Grove Interchange option; 1600 North = 1600 North Interchange option; 800 North = 800 North Interchange option; Center Street = Center Street Interchange option

2.2.2 Level 2 Screening

Level 2 screening was performed on the three alternatives that passed Level 1 screening: the Northern Terminus American Fork Main Street Option, the Southern Terminus 800 North Option, and the Southern Terminus Center Street Option.

2.2.2.1 Level 2 Screening Methodology

Level of Service

The first step in the Level 2 screening process was to determine the number of lanes that would meet level of service goals for a new road. (For a definition of level of service, see Section 1.6.3.1, Current [2005] and Future [2030] Congestion on Key Road Segments.) In urban areas, levels of service of LOS A through LOS D are generally considered acceptable, and LOS E and LOS F are generally considered unacceptable. In some cases, LOS E is considered acceptable if there are constraints that prevent road improvements from being made. For a new road, LOS F is considered unacceptable under any circumstance.

To determine the roadway lane requirements, an alternative was modeled from a connection point at or near the I-15/American Fork Main Street interchange to

the intersection of 800 North and Geneva Road in Orem. This modeling was performed using Version 6.0 of the regional travel demand model. Using the expected (2030) roadway traffic volumes, the levels of service of a three-lane arterial (two travel lanes and a center turn lane), a five-lane arterial (four travel lanes and a center turn lane), and a seven-lane arterial (six travel lanes and a center turn lane) were calculated. The resulting level of service comparison was used to identify which lane configuration would best meet the expected traffic in 2030.

Potential Alignments

The second step in the Level 2 screening process was to determine where the proposed VC should be constructed. For this step, UDOT invited representatives from the cities in the study area, resource agencies, developers, and the public to develop a list of alternative alignments. Once the alternative alignments were developed, they were evaluated based on the Level 2 screening criteria described in Section 2.1, Alternative Development Process. These criteria are:

- Minimize impacts to existing homes and businesses.
- Minimize impacts to important resources such as wetlands, APAs, historic structures, and habitat for sensitive species.
- Consider the land-use and transportation planning objectives of Lehi, American Fork, Lindon, Orem, and Vineyard.

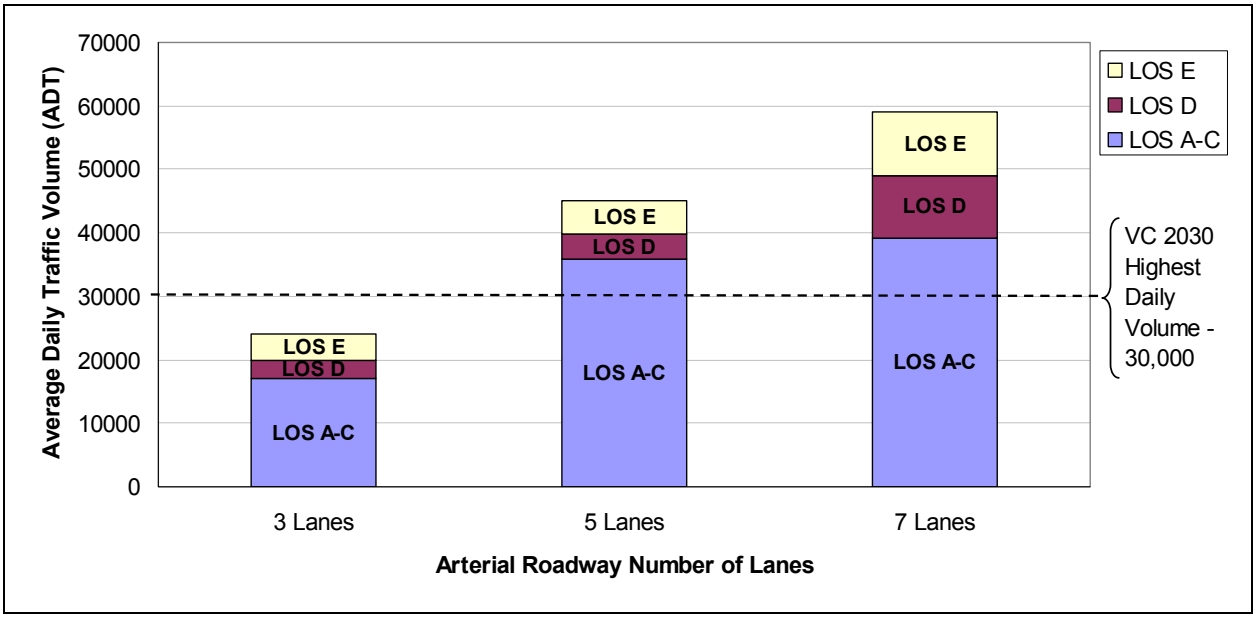
2.2.2.2 Level 2 Screening Evaluation

Level of Service

For the VC, 2030 daily traffic volumes were used to determine the number of lanes required for the new road. For all configurations, it was determined that a center-turn median would be required to provide left-turn lanes at intersections. As shown in Figure 2-2 below, the expected highest volume on the VC is estimated to be 30,000 vehicles per day. This daily traffic volume would require at least a five-lane road to meet the level of service objective of LOS D or better. Because a three-lane road would not meet the LOS D criterion, it was eliminated from further study.

Although a seven-lane alternative would meet the LOS D criterion, it would have far more traffic capacity than what would be needed and would cause substantially more business and residential relocations and impacts to environmental resources (such as wetlands) as a result of the 24 feet of additional right-of-way. Because of this, a seven-lane alternative was considered unreasonable and was also eliminated from further study.

Figure 2-2. Daily Traffic Volumes and Estimated Daily Levels of Service for the Vineyard Connector in 2030



Source: ITE 2000

Potential Alignments for the New Five-Lane Road Alternative

The purpose of evaluating potential alignments for a new five-lane road alternative was to ensure that the alignment or alignments that were carried forward for detailed study would minimize business and home relocations and resource impacts (for example, impacts to wetlands and other waters of the United States, APAs, and cultural resources) and would accommodate planned land-use patterns. Because of the length of the new road and differences in existing resources and uses, the study area was divided into three distinct subareas for the purpose of identifying potential alignments: the northern subarea, the central subarea, and the southern subarea. By dividing the study area, several different combinations of alignments could be evaluated.

Consideration of Land-Use Planning

As part of Level 2 screening, UDOT coordinated with local governments, resource agencies, developers, and the public to identify the new five-lane road alternative as a limited-access, 105-foot-wide principal arterial in a 120-foot-wide right-of-way. Before reviewing specific impacts to homes, businesses, and resources such as wetlands and APAs, UDOT evaluated the three subareas against anticipated future land-use and transportation plans as identified by the local governments. Based on this evaluation, the connection to Center Street in Orem was eliminated during this portion of Level 2 screening due to

incompatibilities with expected land-use and regional traffic patterns assumed by the Town of Vineyard and the City of Orem.

The Town of Vineyard's plans for the southern part of the former Geneva Steel site are primarily residential and, according to a town representative, placing a principal arterial through the southernmost part of the development would not be compatible with the residential nature of the area (HDR 2007a, 2008a). Furthermore, the Town of Vineyard would like the Vineyard Connector to provide the primary access to the commuter-rail station and other planned high-density and commercial development around the station, something that can be accomplished better with a connection to 800 North.

While Orem's street classification map shows Center Street as a principal arterial between I-15 and Geneva Road, connecting the VC into Center Street would not improve regional mobility to the same degree that connecting into 800 North would, since 800 North is already a state highway (SR 52) and provides a direct connection to U.S. 189. Finally, recent improvements to 800 North east of I-15 make it a more logical regional extension of the VC.

Alignment Options

To account for expected construction impacts, the alignments were evaluated as limited-access principal arterials with a right-of-way width of 120 feet. (This right-of-way width includes the 105-foot roadway plus minimal cut and fill; actual construction of any of the options could require a wider right-of-way in some areas where more extensive cut-and-fill slopes would be needed.) Table 2.2-3 and Figure 2-3 through Figure 2-5 below show the potential five-lane alignments that were considered for the VC project and the results of Level 2 screening. Each option assumes a northern connection at American Fork Main Street and a southern connection at 800 North in Orem. These termini are consistent with the Level 1 screening results and the Level 2 evaluation of local land-use patterns.

Table 2.2-3. Results of the Level 2 Screening of Potential Alignment Options

Alignment Option	Screening Criterion[a]					
	Potential Relocations[b]	Compatible with Planned Land-Use Patterns?	Direct Impacts to Property Access[c]	Impacts to Waters of the U.S. (acres)[d]	Impacts to APAs	Carried Forward for Evaluation
Northern Subarea						
N-a: American Fork Main Street north of power line corridor to about 500 East/1500 South	2	Yes	2	Wetland =0.00 Ditch =0.13 Total =0.13	2	✓
N-b: American Fork Main Street south of power line corridor to about 500 East/1500 South	1	Yes	2	Wetland =0.86 Ditch =0.15 Total =1.01	2	
N-c: 300 East Lehi to 500 East/American Fork 1100 South	14	Yes	14	Wetland =1.07 Ditch =0.34 Total =1.41	3	
N-d: Spring Creek/Pioneer Crossing to 500 East/ 1300 South	3	Yes	2	Wetland =1.56 Ditch =0.17 Total =1.73	3	
Central Subarea						
C-a: 500 East/1500 South to boat harbor east of landfill	2	Yes	3	Wetland =1.23 Ditch =0.40 Total =1.63	0	✓
C-b: 500 East/1500 South to boat harbor through north end of landfill and east of landfill	1	Some conflict	4	Wetland =1.21 Ditch =1.56 Total =2.77	0	
C-c: 500 East/1100 South to boat harbor east of landfill	3	Some conflict	3	Wetland =1.83 Ditch =0.42 Total =2.25	0	
C-d: 500 East/1300 South to boat harbor west of landfill	2	Yes	1	Wetland =1.16[e] Ditch =0.09 Total =1.25	0	

Table 2.2-3. Results of the Level 2 Screening of Potential Alignment Options

Alignment Option	Screening Criterion[a]					
	Potential Relocations[b]	Compatible with Planned Land-Use Patterns?	Direct Impacts to Property Access[c]	Impacts to Waters of the U.S. (acres)[d]	Impacts to APAs	Carried Forward for Evaluation
Southern Subarea						
S-a: Vineyard West	2	Yes	3	Wetland =0.00 Ditch =0.01 Total =0.01	0	✓
S-b: Vineyard East	2	Some conflict	3	Wetland =0.00 Ditch =0.01 Total =0.01	0	

[a] To simplify the comparison of alternatives, impacts are based on a 120-foot-wide right-of-way and do not account for cut and fill or side street improvements. In most cases, the 120-foot right-of-way would encompass cut and fill.

[b] A direct effect would occur if the right-of-way needed for construction would displace a business or a home. Potential relocations include land that is platted for development and that might support a finished home by the time the project is built. Note that these numbers are estimates only and could be refined based on the final design of the project and the actual right-of-way needs.

[c] Direct impacts to property access could involve consolidating existing driveways or providing new driveways or access roads to affected properties. Note that these are estimates of impacts and are in addition to those that would be part of any potential relocations.

[d] Does not include riparian wetlands, which are not subject to regulation under the federal Clean Water Act. Wetlands and ditches are identified separately in the table because wetlands are considered special aquatic sites and are evaluated differently under the Clean Water Act.

[e] Although Option C-d would have fewer wetland impacts, it would pass through a deed-restricted wetland mitigation bank. The U.S. Army Corps of Engineers (USACE) cannot legally authorize the fill of wetlands in this area for the project (see Section 2.2.2.3, Level 2 Screening Results).

Figure 2-3. Level 2 Screening Alignment Options – Northern Subarea

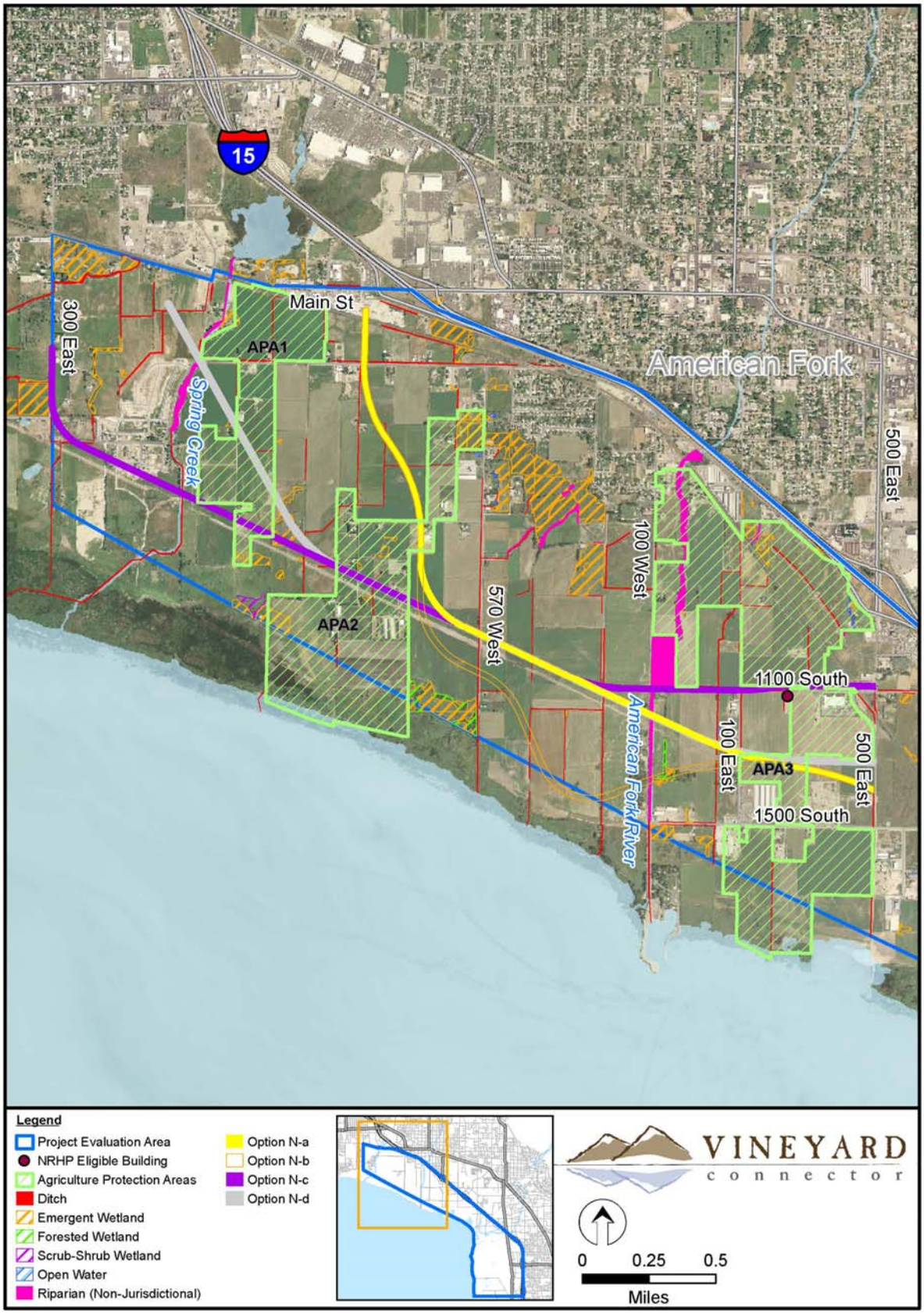


Figure 2-4. Level 2 Screening Alignment Options – Central Subarea

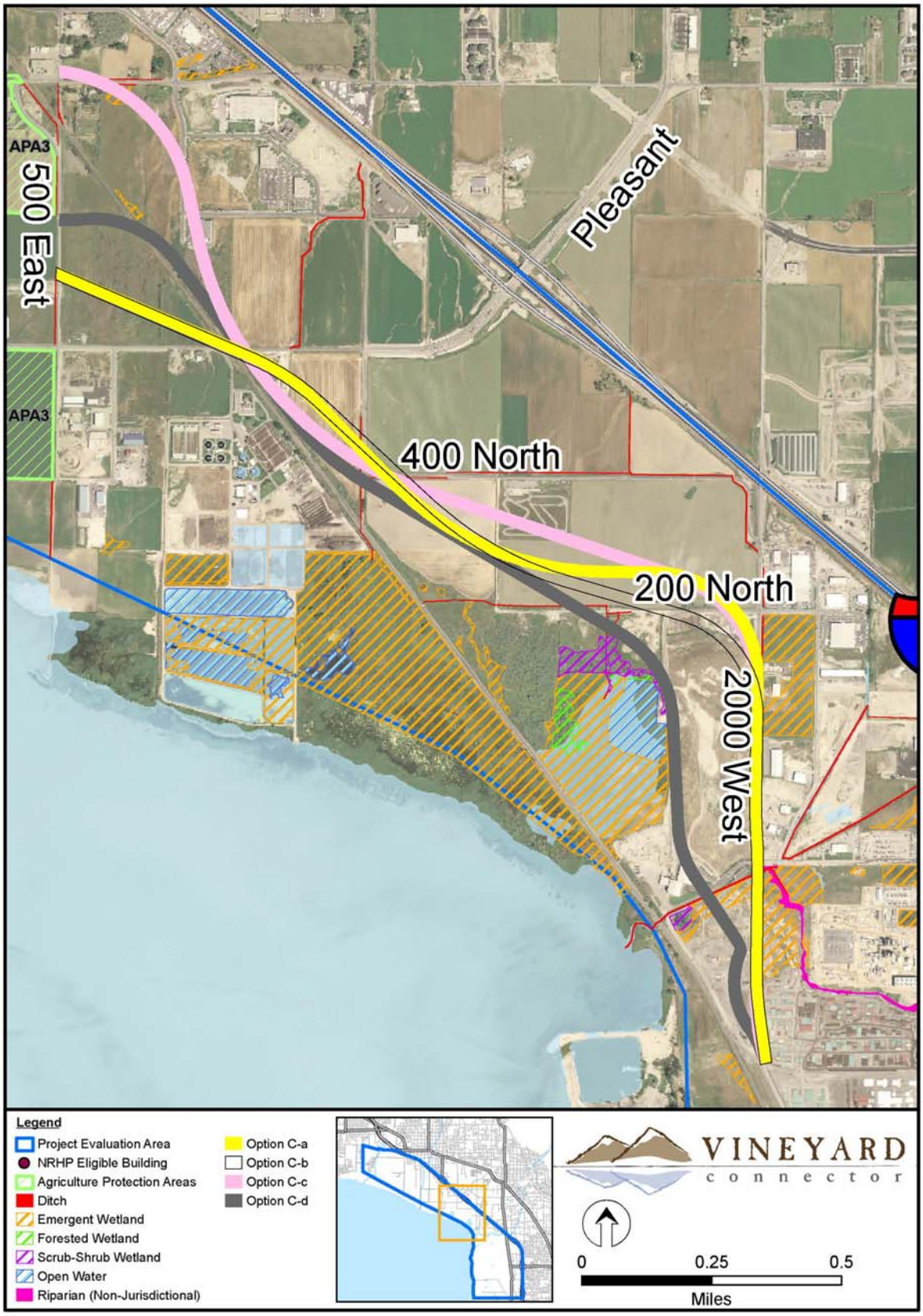
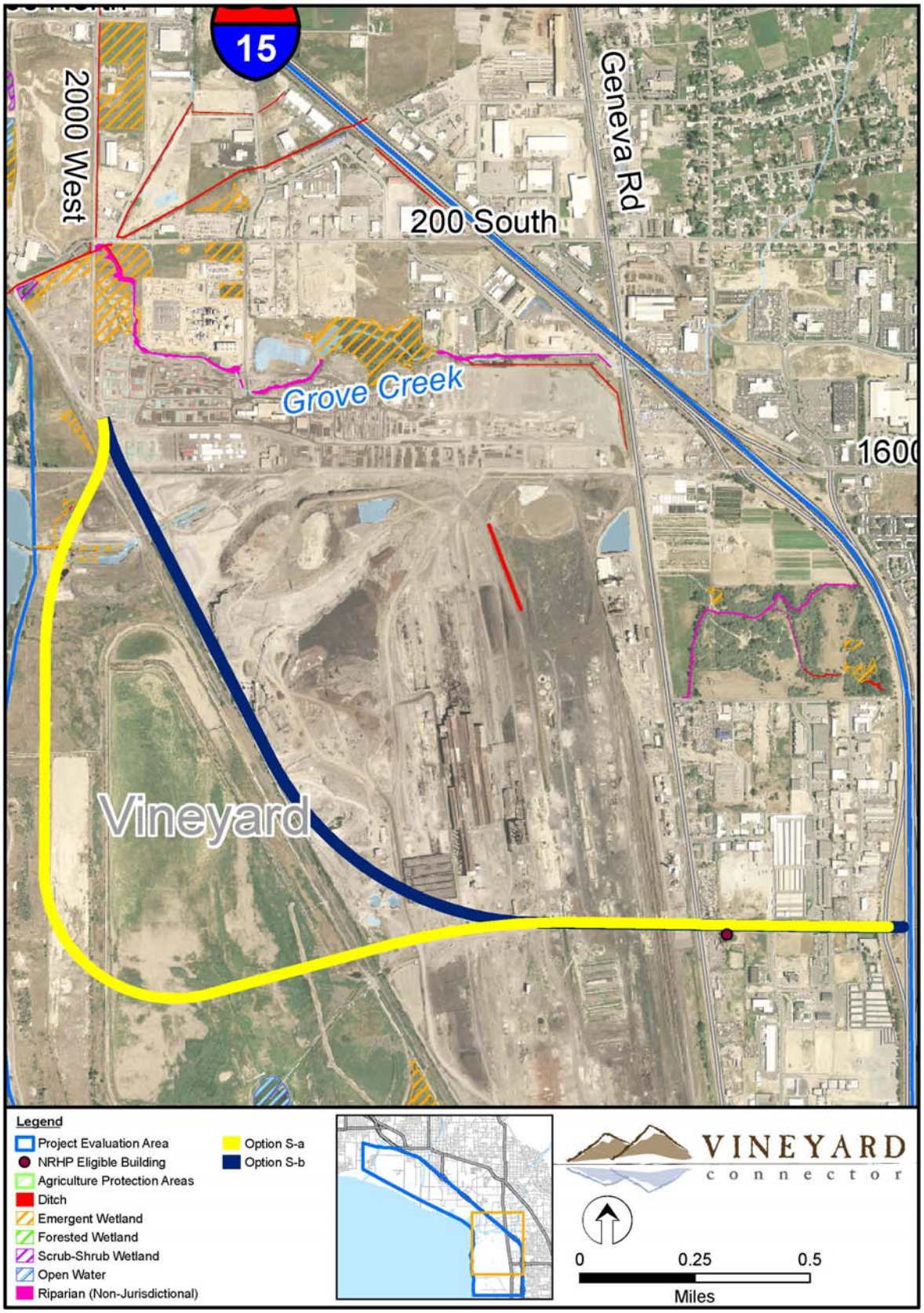


Figure 2-5. Level 2 Screening Alignment Options – Southern Subarea



Alignment Option Descriptions

Northern Subarea

Option N-a: American Fork Main Street North of Power Line Corridor to about 500 East/1500 South in American Fork. This option would start just west of the American Fork Main Street/I-15 interchange (at about 1020 West) and would travel over the Union Pacific Railroad tracks and south through mostly undeveloped land. The alignment would turn southeast just north of a high-voltage power line corridor that generally parallels the Utah Lake shore and would then run parallel to the north side of the power line corridor. This alignment would cross the railroad tracks again just north of 1500 South and just west of 500 East in American Fork.

Option N-b: American Fork Main Street South of Power Line Corridor to about 500 East/1500 South in American Fork. American Fork City brought forward three alignment options along or very near 1500 South. American Fork City would prefer an option closer to Utah Lake to provide more developable land north of the proposed road and a boundary (limit) for development. In addition, American Fork City commented that a road north of 1500 South would further divide the community, reduce residents' quality of life, and not meet its land-use and transportation planning objectives as identified in the City's land-use and transportation plans. For evaluation purposes, American Fork City's three options were combined into one option along 1500 South, which was designed to minimize impacts to wetlands and to minimize potential relocations. Like Option N-a, this option also starts just west of the American Fork Main Street/I-15 interchange and travels south over the tracks and toward the power line corridor. Option N-b differs in that it passes under the power line corridor and continues southeast toward the Utah Lake shore. This option turns east at about Utah County 6400 West and passes under the power line again at about American Fork 100 East. This option also crosses the railroad tracks at about 1500 South 500 East in American Fork.

Option N-c: 300 East in Lehi to about 500 East/1100 South in American Fork. This option would begin on 300 East and about 1500 South in Lehi and would travel south of the Spring Creek Ranch residential subdivision. It would pass through mostly undeveloped land that is currently used for agriculture. This alignment would parallel the north side of the power line corridor before turning west at about American Fork 1100 South. This option would cross the railroad tracks just west of 500 East in American Fork.

Option N-d: Spring Creek/Pioneer Crossing to about 500 East/1300 South in American Fork. This option would start at Pioneer Crossing and cross Spring Creek on the north end of the Spring Creek Ranch residential subdivision. East of Spring Creek, this alignment would travel through mostly undeveloped land that is currently being used for agriculture. This alignment would generally run parallel to the power line corridor on the north side before turning due east at about 1300 South and 100 East in American Fork. This alignment would cross the railroad tracks at about 600 East in American Fork.

Central Subarea

Option C-a: 500 East and about 1500 South in American Fork to the Lindon Boat Harbor, East of Landfill. This option would generally travel southeast after crossing the railroad tracks just north of 1500 South. The alignment generally follows the power line corridor southeast until it turns south just north of about 200 North 2000 West in Lindon. From this point, the alignment follows 2000 West and crosses the railroad tracks just east of the Lindon Boat Harbor.

Option C-b: 500 East and about 1500 South in American Fork to the Lindon Boat Harbor through the North End of the Landfill and East of the Landfill. This option would generally follow the same route as Option C-a except that it would be closer to the power line corridor and would turn south on a slightly different alignment that would travel through the northern end of the closed landfill. Option C-b joins Option C-a on 2000 West and travels on the east side of the landfill to the railroad track crossing just east of the boat harbor.

Option C-c: 500 East and about 1100 South to the Lindon Boat Harbor East of the Landfill. This option would start farther north than Options C-a and C-b. It would turn south immediately after the railroad crossing at 1100 South until the power line corridor, and from there the alignment would generally follow the same route as Option C-a. Option C-c also travels along 2000 West to the railroad track crossing just east of the boat harbor.

Option C-d: 500 East and about 1300 South to the Lindon Boat Harbor West of the Landfill. After crossing over the railroad tracks at about 1300 South, this option would travel southeast to the power line corridor and would then follow the power line corridor until it crossed under the corridor just south of 200 North in Lindon. The alignment would then travel south along an existing dirt road on the west side of the capped landfill and through an existing waste transfer station before turning southeast to intersect 2000 West just east of the boat harbor.

Southern Subarea

Option S-a: Vineyard West. This option would cross the railroad tracks near the Lindon Boat Harbor and travel south on the west side of the tracks to the planned commuter-rail station (which is also planned for the west side of the tracks). Past the rail station, the alignment would turn east, cross over the tracks, and connect with 800 North in Orem at Geneva Road.

Option S-b: Vineyard East. This option would not cross the railroad tracks at the boat harbor but would instead parallel the east side of the tracks between the boat harbor and about 800 North in Orem. At 800 North, the alignment would turn east to intersect with the existing 800 North at Geneva Road. Because this alignment would not provide direct access to the commuter-rail station, an additional spur road that crosses over to the west side of the tracks would have to be built to provide access.

2.2.2.3 Level 2 Screening Results

The potential alignment options for each subarea were evaluated against the screening criteria shown above in Table 2.2-3, Results of the Level 2 Screening of Potential Alignment Options. Each option was also further evaluated for compatibility with expected local development patterns. All of these factors were considered when determining which options should be eliminated and which should be carried forward for detailed study. The following sections review the screening results for each subarea (northern, central, and southern).

Impacts to APAs and wetlands play an important role in determining if an alternative should be carried forward for detailed study. APAs cannot be condemned for highway purposes unless (1) the landowner requests the removal of the designation or (2) the applicable legislative body (that is, the legislative body of the county, city, or town in which the APA is located) and the County's agricultural advisory board approve the condemnation, provided that there is no reasonable and prudent alternative to the use of the land within the APA for the project. The northern subarea of the evaluation area contains three APAs, none of which can be completely avoided. Due to the configuration of the APAs, all of the options studied would pass through at least two of the APAs. UDOT would need to select an alternative that affects the fewest APAs because it represents a reasonable and prudent alternative to the alternatives with more APAs impacted.

Wetlands are regulated under Section 404 of the federal Clean Water Act. Under the Act, fill material cannot be placed in waters of the U.S. if there is a less environmentally damaging practicable alternative to that part of the activity that would discharge fill material to the regulated waters. USACE and EPA do, however, allow for consideration of cost, logistics, and technology when identifying the least environmentally damaging alternative. Under the USACE and EPA regulations, the alternative with the least amount of wetland impacts should be selected unless there are compelling reasons related to cost, logistics, and/or technology that make an option impractical.

Northern Subarea

The options in the northern subarea differ in where they connect to the existing transportation system, although all four options would accommodate a connection to Pioneer Crossing. Options N-a and N-b, which connect to American Fork Main Street near the I-15 interchange, would provide access to an area that contains several parcels that have recently been annexed to American Fork and to an area where the City would like to continue annexations (HDR 2008b).

Option N-a would not affect any mapped wetlands and would directly affect (pass through) two APAs. Option N-a could result in two relocations and would directly affect access to two additional properties.

Option N-b is similar to Option N-a except that Option N-b crosses under an existing high-voltage power line twice. This different alignment would have 0.86 acre of wetland impacts but would also pass through two APAs. Option N-b could result in one relocation and would directly affect access to two additional properties.

Option N-c, which connects to 300 East in Lehi, would provide access to the developing area of far eastern Lehi. This option would require up to 14 relocations (some of which are platted residential parcels with homes currently under construction) and would directly affect access to another 14 properties. Option N-c would affect just over an acre of wetland, would directly affect three APAs, and would require two crossings of the power line corridor.

Option N-d, which would connect to Pioneer Crossing just north of the Spring Creek Ranch residential subdivision, would be compatible with American Fork's planned transportation system and future land-use plans but would directly affect three APAs. This option would have the highest wetland impact at 1.56 acres. Option N-d would result in three relocations and would directly affect two property accesses.

Because Option N-a is the only alternative that would not affect wetlands, represents a reasonable and prudent alternative to affecting two of the three APAs in the evaluation area, and has similar business and residential impacts as the other options, it was carried forward for detailed study. Options N-b, N-c, and N-d were eliminated from detailed study because of their higher impacts to wetlands and/or APAs.

Option N-b was preferred by American Fork but was eliminated because it would have greater wetland impacts than Option N-a. In addition to the wetland impacts, UDOT compared the financial risks associated with crossing the power line corridor twice with this alignment versus the financial risks of Option N-a, which does not cross the power line corridor. Crossing the power line corridor would require UDOT to relocate the high-power electrical line and a high-pressure gas line. UDOT discussed the utility relocations with the utility companies, who said that there is only a 1-week period each year when the work could be performed. Work outside this period would require UDOT to compensate each utility for its lost revenue. UDOT decided that the risk to the construction schedule under Option N-b was too high to make the alternative reasonable, given that Option N-a avoids this risk.

Central Subarea

The options in the central subarea differ in where they cross the railroad tracks on the north and how they pass by the capped landfill in Lindon. All options would have about the same amount of wetland impacts, but USACE has noted that Option C-d would pass through a deed-restricted wetland mitigation bank belonging to PacifiCorp (Rocky Mountain Power). If the road were to pass through that area, USACE could not legally authorize the fill of any wetlands in the mitigation bank area from UDOT's project. Because UDOT could not build the road through the PacifiCorp mitigation area without filling wetlands, Option C-d was eliminated from further study.

Of the three remaining options, Option C-c would have the largest amount of wetland impacts (0.6 acre more than Options C-a and C-b). The expected potential relocations and access impacts are similar for the three options. Option C-b would require mining the capped landfill, which involves not only excavation but also disposal and remediation of potentially hazardous material. While proximity to the capped landfill is not a screening criterion, a close review of Option C-b shows that the construction cost and risk to build the road through the capped landfill exceed levels that UDOT would assume. Even though Options C-a and C-c would require a relocation that Option C-b would avoid, UDOT eliminated Option C-b based on cost and logistical considerations associated with mining the landfill.

Of the remaining alignments, Option C-c has slightly higher wetland impacts. The two alignments are otherwise very similar except in their northern connection point and in their distance from the power line corridor. As it worked with local cities to develop project alternatives, UDOT heard from American Fork City that neither option was compatible with the city's planned transportation network but that a crossing near 1500 South was preferred to a crossing at 1300 South. Of the two options, Lindon City preferred Option C-a over Option C-c because Option C-a would preserve more area for future development east of the VC. UDOT chose to carry Option C-a forward for further review since it would have the lowest wetland impact and was preferred by the two cities over Option C-c.

Southern Subarea

Options S-a and S-b have the same number of potential relocations and property access impacts, and neither option would affect any APAs or wetlands. Option S-a is consistent with UTA's plans for its commuter-rail station and is consistent with the Town of Vineyard's land-use plans for the area. Option S-b would not provide a direct access to the commuter-rail station and would require the construction of an additional spur road to provide access. Because it would not provide the best access to the planned commuter-rail station and is less compatible with the Town of Vineyard's land-use plans for the area, UDOT eliminated Option S-b from further study and carried Option S-a forward for further review.

2.3 Alternatives Considered for Detailed Study

Two alternatives were carried forward for detailed study in this document. The first, the No-Action Alternative, considers what would happen if the VC is not built. The second, the Action Alternative, combines Options N-a, C-a, and S-a to create a single north-south route between American Fork and Orem.

2.3.1 No-Action Alternative

The No-Action Alternative serves as a baseline so that decision-makers can evaluate the environmental effects of the action alternative(s).

If the No-Action Alternative is selected, the VC would not be built. However, other improvements to adjacent transportation facilities would still be made. These improvements, which are identified in the Regional Transportation Plan (MAG 2007) and Statewide Transportation Improvement Program (UDOT 2008), are as follows:

- I-15, Utah County to Salt Lake County improvements
- American Fork 500 East (SR 180)
- East-West Connector, Saratoga Springs to American Fork
- State Street (US 89), Orem to American Fork
- Geneva Road, Provo to Orem
- Pleasant Grove Boulevard in Pleasant Grove, I-15 to State Street
- Pony Express Parkway (1900 South), Saratoga Springs to American Fork
- 800 North in Orem, Vineyard to 1000 East
- 1600 North in Orem, Vineyard to 400 West
- Center Street in Orem, Vineyard to I-15
- Commuter Rail, Provo to Salt Lake City

These projects are intended to enhance mobility in the area and would still be constructed under the No-Action Alternative. These projects might have some environmental impacts, which are currently being or would be evaluated in separate documents. It is also possible that developers would build local streets in place of the VC to provide access to planned developments.

2.3.2 Action Alternative

In order to evaluate the Action Alternative in detail, UDOT conducted preliminary engineering to determine the alternative's right-of-way requirements. The specific right-of-way was then evaluated to determine its impacts to the community and the natural environment (for a detailed discussion of impacts, see Chapter 3, Affected Environment and Environmental Consequences). This evaluation included a series of steps to determine the final roadway design and

alignment as described in Section 2.3.2.1, Alternative Refinement. The Action Alternative is shown in Figure 2-6 below.

2.3.2.1 Alternative Refinement

Environmental and Community Considerations

To further refine the Action Alternative to reduce impacts to existing businesses and homes, wetlands, APAs, cultural resources, and land-use patterns, UDOT coordinated with and met with representatives of other agencies, city representatives, area residents, business representatives, and local developers. During the meetings, the potential alignment was reviewed and modified to reduce impacts. Most of the alignment modifications consisted of minor shifts to avoid impacts related to planned future development and planned local roads.

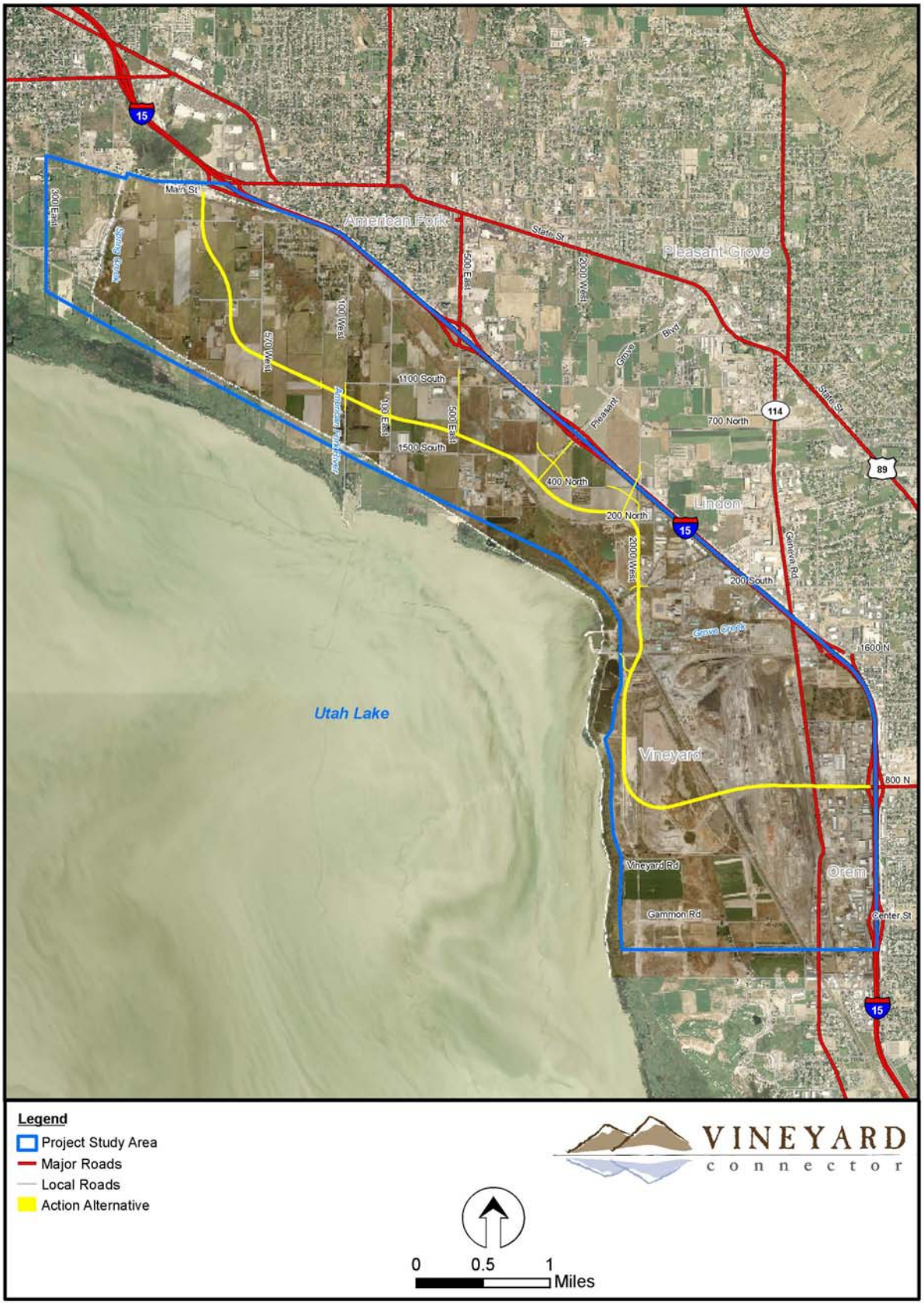
Engineering Considerations

The engineering considerations for the VC included typical sections, drainage, utilities, and transit (commuter rail) considerations. The VC was designed as a limited-access road with a 45-mph (miles per hour) design speed. This limited-access road would allow access onto the road only at cross streets, which would typically be spaced at half-mile intervals. An exception to this spacing requirement might be allowed inside the future planned-community development on the former Geneva Steel plant site, which will also include the future UTA station for commuter rail, light rail, and bus transit. Access considerations for this area would be developed in coordination with UTA, the Town of Vineyard, and the planned-community developer.

The context of the VC is that it is a regional road that supports vehicle, pedestrian, and bicycle uses. Guidelines from both UDOT and the American Association of State Highway and Transportation Officials (AASHTO) were used to set the design and safety standards for this facility and to develop the typical section (roadway width and roadway elements) for the alignment. Drainage considerations included capturing stormwater runoff from the road and discharging it into local detention basins or city stormwater systems, if available.

The alternative alignment was also designed to accommodate existing interstate high-voltage electrical transmission lines that run roughly north-south through the project area and to provide enough clearance for rail crossings at four locations.

Figure 2-6. Vineyard Connector Action Alternative



Transit Considerations

UTA is planning to construct commuter-rail stations on the north and south ends of the VC alignment. UTA plans to design the north station, which would be situated southwest of the I-15/American Fork Main Street interchange, based on the ultimate configuration of the interchange and the VC connection. The preliminary design of the road is configured to accommodate the location and design of the southern station as it is currently being planned by UTA. UTA's long-range plans also call for light rail and bus transit service to the Vineyard commuter-rail station.

As planning for the VC progresses, UDOT would continue to coordinate with UTA, the cities along the corridor, and local developers to ensure that the new road could accommodate the expected traffic patterns associated with the anticipated development patterns and the rail stations. For example, representatives with the Town of Vineyard have stated that direct station access is a priority and that future mixed-use development around the station will be the hub of the planned community development on the former Geneva Steel plant site (HDR 2007a, 2008a).

2.3.2.2 Description of the Action Alternative

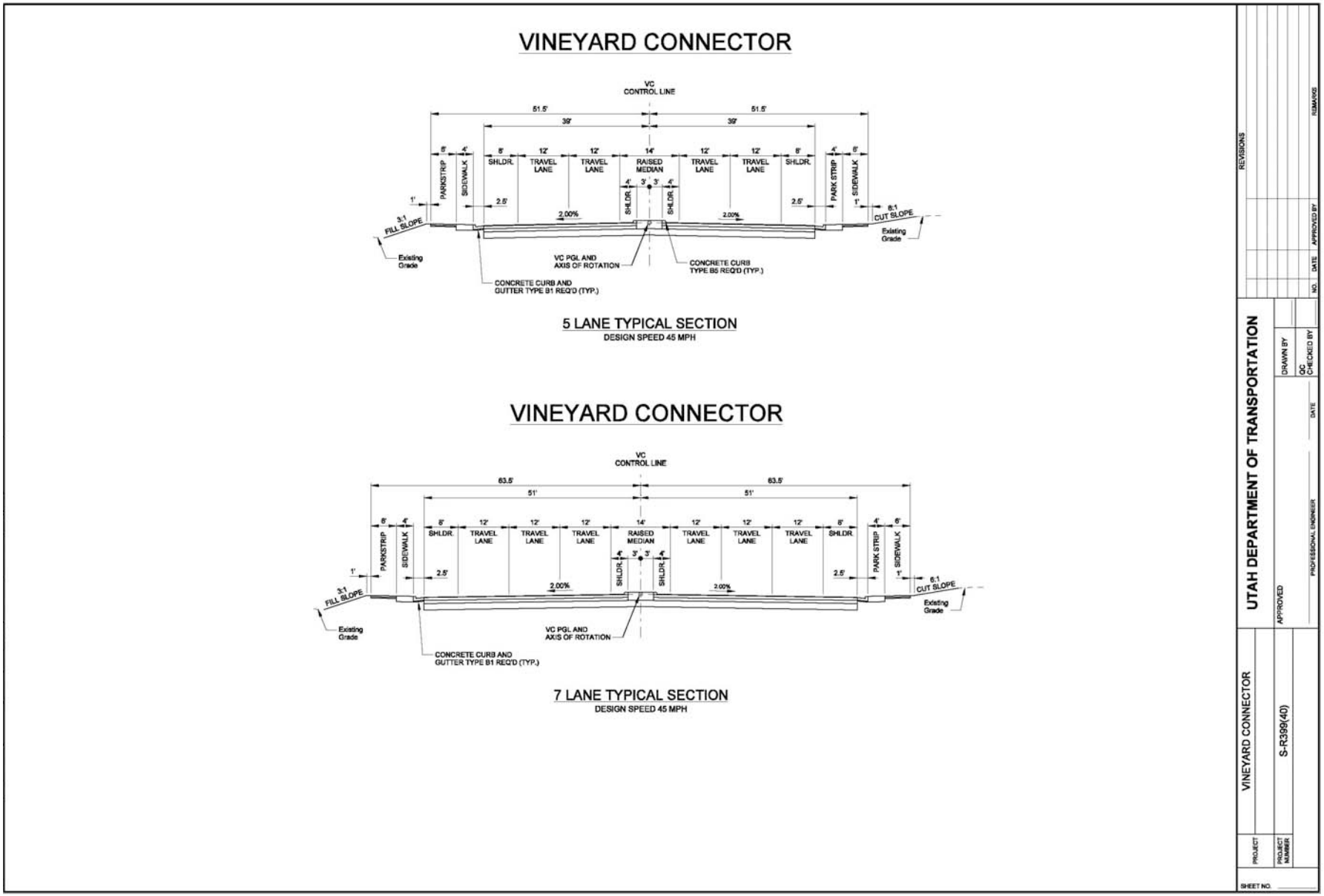
The following sections describe the Action Alternative, including the roadway width (typical section), cross streets and structures, community amenities, detention basins, potential utility relocations, and construction phasing.

Typical Sections

The Action Alternative would consist of a five-lane (105-foot-wide), limited-access road with a design speed of 45 mph and a speed limit of 40 mph. The following elements would be included:

- A five-lane (105-foot-wide) cross-section from Pioneer Crossing to about 100 feet west of Geneva Road consisting of four 12-foot travel lanes, a 14-foot raised median, and 8-foot shoulders (see Figure 2-7 below). The 14-foot raised median would be used to provide a left-turn lane at some locations, which would become the fifth lane.
- A seven-lane (130-foot-wide) cross-section from about 100 feet west of Geneva Road to I-15 consisting of six 12-foot travel lanes, a 14-foot median, and 8-foot shoulders (see Figure 2-7 below). The seven-lane cross-section is required to be compatible with the intersection of Geneva Road, which has dual left-turn lanes and dedicated right-turn lanes plus two through lanes.
- Depending on the jurisdiction through which it passes, the road would have one of the following configurations:
  - 2.5-foot curb and gutter, 4-foot park strips, 6-foot sidewalks, and 1 foot between the back of the sidewalk and the edge of the right-of-way on both sides of the road
  - 2.5-foot curb and gutter, 4-foot buffer, and 12-foot asphalt trail with 0.5 foot between the back of the trail and the edge of the right-of-way on one side of the road only
- Dedicated right-turn and left-turn lanes at intersections with traffic signals.
- Support for bicycle use by providing Class III bicycle routes. A Class III bicycle route is identified by signs as a bicycle route, but it is not striped as a separate bicycle lane, and bicyclists must use either the travel lane or the roadway shoulder.

Figure 2-7. Vineyard Connector Typical Sections



Cross Streets and Structures

The VC project would have at-grade intersections with north-south-oriented cross streets between American Fork and the connection to 800 North at Geneva Road. Intersections with traffic signals and dedicated right- and left-turn lanes would be provided where the VC would intersect or cross existing roads, such as Pioneer Crossing at the northern terminus, 1500 South in American Fork, 200 North in Lindon, 200 South in Lindon/Vineyard, and roads inside the Geneva Steel redevelopment area.

Because the VC would be classified as a limited-access facility, no access would be allowed to the VC except at cross streets with traffic signals. Not all intersections would have a traffic signal immediately after construction is complete. Intersections could receive a traffic signal once traffic volumes are high enough to warrant a signal.

This project includes necessary widening to 800 North between Geneva Road and about 1500 West in Orem. East of 1500 West, the existing pavement is wide enough to accommodate the VC connection and would be restriped as necessary.

The following structures would be included with the project:

- A box culvert or 60-inch pipe culvert for the American Fork River crossing
- Bridges spanning the Union Pacific and UTA commuter-rail tracks at Main Street, 500 East, and 1500 South in American Fork, at 1600 North in Lindon, and just south of the planned Vineyard commuter-rail station in Vineyard
- Culverts for ditches and drainage canals

Other Roadway Improvements

In order to maintain and improve regional mobility and connectivity, roads intersecting the VC or affected by the VC would need to be modified to ensure that safety and traffic flow requirements are maintained. These improvements, which would become part of the VC project, include the following:

- **Geneva Road (Orem)** – Improve Geneva Road in the vicinity of its intersection with the VC to provide the necessary lane configurations, at-grade rail crossing, and proposed Geneva Road project improvements to ensure that all operational and safety requirements are satisfied.
- **500 East (American Fork)** – Improve connectivity to the 500 East interchange by providing a grade-separated structure over the Union Pacific Railroad tracks and the proposed UTA FrontRunner track. This improvement would address safety and congestion conflicts by avoiding an at-grade crossing of the tracks.
- **Pleasant Grove Boulevard (Lindon)** – Realign Pleasant Grove Boulevard between I-15 and the VC to provide more-direct access to the VC and to improve safety by eliminating a severely skewed intersection with the VC. To improve mobility and maintain access to current and master-planned developments in the area, a north-south access road would be constructed from Pleasant Grove Boulevard between I-15 and the VC.
- **Proctor Lane (Lindon)** – The Proctor Lane crossing over I-15 would be realigned to improve connectivity to the VC and to improve and re-establish access to 200 North and 1900 West. In addition, this realignment would improve connectivity to other local access roads.
- **Boat Harbor Access (Lindon)** – Construction of the VC would require elimination of the existing at-grade crossing at 2000 West (Lindon), which would also affect access to the Lindon Boat Harbor. UDOT would construct a new access to the Lindon Boat Harbor and other properties near the boat harbor to maintain connectivity.
- **Other Accesses (American Fork/Orem)** – To maintain regional mobility and improve connectivity, existing roads intersected by the VC would be improved at and near the intersections. These improvements would include construction of appropriate turn lanes and modifications to the road profile and cross-sections to improve intersection safety and mobility and to accommodate local planning.

The alternative alignment was also designed to accommodate existing interstate high-voltage electrical transmission lines that run roughly north-south through

the project area and to provide enough clearance for rail crossings at four locations.

Figure 2-6 above, Vineyard Connector Action Alternative, shows the location of cross streets that would be improved as part of the VC project.

Community Amenities

During the development of the VC project, UDOT met with city representatives to discuss the context of the corridor. Some of the concerns that were raised included access to recreational facilities and access to and within planned commercial and light-industrial developments.

Lindon City and the Town of Vineyard are both planning construction of a regional trail connection along the Hollow Ditch (Grove Creek) corridor. This trail, called the Lindon Heritage Trail in the MAG Regional Transportation Plan, will enter the VC project area from the east and ultimately connect to the Utah County Lakeshore Trail west of the evaluation area. The Lindon Heritage Trail alignment between Pioneer Way and the Lakeshore Trail has not been finalized, so UDOT would work with the cities to ensure that the trail connection is either incorporated into or is not prevented by construction of the VC.

Lindon City is also planning to construct a new park on city-owned property in the project area. Park users will be able to access the Lakeshore Trail, Lindon Heritage Trail, and Lindon Boat Harbor from this new park. UDOT would work closely with city representatives to ensure that the VC would allow access to the park site and would minimize impacts to the park. The road used to access the park would also serve as the access to the Lindon Boat Harbor (a privately operated facility).

Finally, Lindon City is planning to construct a north-south trail that would connect 1500 South west of the I-15/Pleasant Grove interchange to the Lindon Heritage Trail. City representatives have stated that this trail could be incorporated into the VC as a 12-foot-wide asphalt trail on one side of the new road (HDR 2007b). UDOT would work with the City to ensure that this planned trail is either incorporated into the VC or that the VC would not prevent future construction of the trail on a different alignment.

The VC would pass through developing commercial areas in American Fork and Lindon. Lindon City representatives have expressed concern regarding how the VC might affect future access to this area and the amount of land conversion (from developable commercial/industrial land to roadway use) that road construction might require (HDR 2008c).

Detention Basins

As part of the VC project, a stormwater drainage system would be constructed to control the additional runoff that would result from the increase in impervious (paved) area due to the project. The details of the drainage design would be determined during the final design of the project, but UDOT anticipates that the peak flow rate of the runoff would be controlled to match the existing conditions in order to use existing storm drain features and prevent downstream flooding. Stormwater detention basins, vegetated swales, or a combination of control features would be used to store stormwater runoff and reduce peak flows. These stormwater controls also improve water quality by allowing sediment and other pollutants to settle out of the water before it is discharged into receiving waters.

Detailed geotechnical studies and a more-complete design would be required to appropriately size and locate the drainage features. Drainage features would be located on undeveloped land that does not contain wetlands and would be coordinated with the cities and local developments.

Potential Utility Relocations

Several utilities are within the proposed VC right-of-way including electric lines (overhead lines and buried lines), gas lines, water lines, telephone/fiber optic lines, and irrigation systems. The road would cross under overhead power lines in American Fork and along 2000 West in Lindon. The new crossing in American Fork might require utility poles to be relocated or elevated. The 2000 West crossing would follow an existing road undercrossing but might require at least two existing power poles to be raised. Other utility relocations would be identified and addressed during the final design of the project.

Construction Phasing

The VC project has full state funding. Once UDOT makes a final decision and the environmental process is complete—which would include obtaining Clean Water Act authorization from USACE—UDOT would begin purchasing right-of-way and would begin construction. UDOT expects that construction would start in early 2009 and would be completed by 2011. The final construction schedule, including which segments would be constructed first, would be finalized once a construction contractor is selected.

2.4 References

City of Orem

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